Optimasi Bioplastik Kelobot Jagung (*Zea mays* L.) Ditinjau dari Nisbah Biokomposit, Penambahan ZnO dan *Plasticizer* Gliserol

The Optimation of Corn-Husk (Zea mays L.) Bioplastic as Reveal by the Biocomposite Ratios, ZnO and Plasticizer Gliserol Additions

Shinta Khalistyawati*, A. Ign. Kristijanto**, dan Sri Hartini**
*Mahasiswi Program Studi Kimia Fakultas Sains dan Matematika
**Dosen Program Studi Kimia Fakultas Sains dan Matematika
Universitas Kristen Satya Wacana, Salatiga
Jln. Diponegoro no. 52-60 Salatiga 50711, Jawa Tengah-Indonesia
652012002@student.uksw.edu

ABSTRACT

This study aims to obtain bioplastics from corn husk according ISO 7818: 2014 and biodegradable, in terms of the ratio of biocomposites, the addition of ZnO, and the plasticizer glycerol, as well as their interactions. Data were analyzed by Factorial design (3 x 3 x 3) with basic design Randomized Completely Block Design (RCBD), 3 replications. As the first factor is the biocomposites ratio of starch:(corn husk:PLA), which is 70:(15:15); 50:(25:25); and 30:(35:35), respectively; the second factor is ZnO addition, i.e.: 3%, 4.5%, and 6%; and as the third factor is the addition of glycerol, namely: 30%, 45%, and 60%; while as the block is the time analysis. Biodegradability data of bioplastic were analyzed using covariance analysis and it was laid out with Randomized Completely Block Design (RCBD), 5 treatments and 5 replications. As the treatment is various compositions of corn husk bioplastic and as the block is the time analysis. To test the difference between treatments means, the Honest Significant Differences (HSD) were used at 5% level of significance.

The results of the study showed that the bioplastic composed of starch:(corn husk: PLA) 70:(15:15), 3% ZnO and 30% glycerol have thickness of 0.0277 ± 0.0013 cm and density of 0.5206 ± 0.0092 g/cm^3. Bioplastics which fulfil criteria of SNI 7818: 2014 is composed starch:(corn husk:PLA) 70:(15:15), ZnO 4.5% and glycerol 30%, which has value of 8.55 MPa tensile strength, 49.17% elongation, 4.26 N longitudinal tear of strength and 2.41 N transversal tear of strength. Bioplastics composed starch:(corn husk:PLA) 70:(15:15), ZnO 3% and glycerol 60% is biodegradable in compost substrate within 3-10 days with a residual mass of 0.0118 ± 0.0050 g to 0.0243 ± 0.0028 g and the efective biodegradability 75.18% - 88.98%. Further more, in the EM4 consortium for 10 days has residual mass of 0.0195 ± 0.00044 g and the efectivity of 66.81%.

Keywords : bioplastic, corn husk, PLA, ZnO, glycerol